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SCIENCE

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THE ORBITS OF FREELY FALLING BODIES

THE path described by a body falling freely from a considerable height above the surface of the earth presents a problem of interest alike to the mathematical and to the experimental physicist. The former sees in it a capital application of the principles of "relative motion"¹ and the latter sees in it a promising way of demonstrating the rotation of the earth. It has attracted perennial attention for more than a century and has been frequently referred to in this journal during the past decade.

The mechanical aspects of this problem were first carefully considered by Gauss and Laplace one hundred and ten years ago. Gauss's equations of motion for a falling body were furnished in a letter to Benzenberg, who was interested especially in the proper interpretation of experimental results. Gauss's solution of the problem is now accessible in the fifth volume of his collected works. He concluded that in addition to the obvious easterly deviation there should be a small meridional deviation towards the equator from the plumb line defined by a bob suspended from the initial position of the body and normal to some plane of reference below. It seems probable that this latter conclusion prompted Laplace to reinvestigate the subject, for he published a very remarkable paper in May, 1803, in the *Bulletin de la*

¹This means only that account must be taken of the variations in position of some of the axes or planes of reference with the lapse of time. Why such motion should have been called "relative" and the less complex motion called "absolute" is a question worthy of investigation in the history of mechanics.